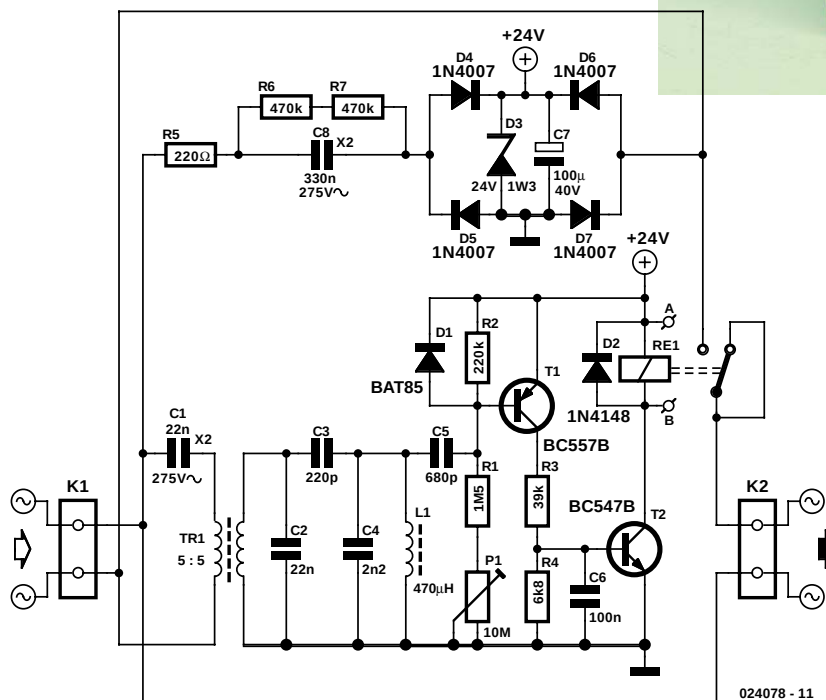


Mains Remote Switch

This compact design forms a remotely operated switch that receives its control signal via the mains voltage. The switch is operated using the 'mains remote transmitter' described elsewhere in this issue. With this transmitter, a switch should be connected between pins 1 and 2 of K1. Depending on the application, this must be either a press contact or a make contact.

The idea of the 'mains remote switch' is that a relay is energised in order to connect the mains voltage on K1 through to K2. The 'receiver' (a somewhat exaggerated term for such a simple design) is formed by Tr1 and the tuned circuit L1/C4. The network C1/Tr1/C2 serves as a coupled circuit tuned to the frequency of 143 kHz generated by the transmitter. The selectivity is determined by L1/C4 and is



primarily dependent on the standard suppression coil L1.

Gain for operating the relay is provided by T1. The amplified signal is smoothed by C6 and provides the voltage necessary to cause T2 to conduct and energise the relay. The voltage divider formed by P1, R1 and R2 provides a bias voltage for T1 in order to increase the sensitivity of the receiver. This also allows the relay to be energised without a received signal. D1 ensures that C5 does not become charged and prevents T1 from conducting even more. The operation of the circuit is based on the fact that the incoming signal is sufficiently strong to overcome the hysteresis of the relay. Once the signal is no longer present, the relay must naturally again release.

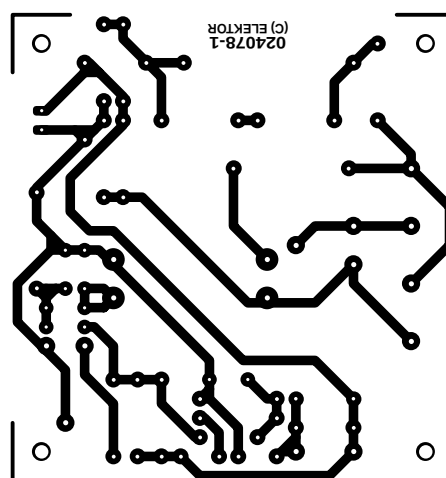
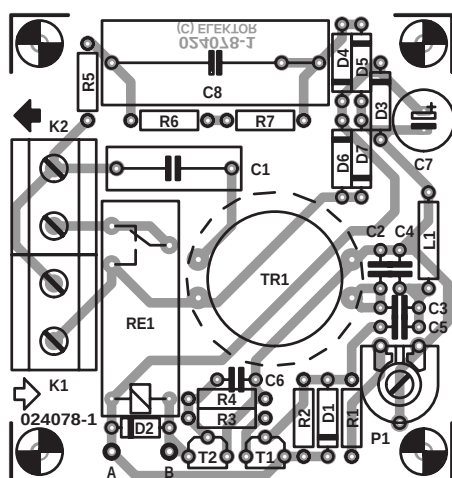
To be honest, it must be noted that the simple design of this circuit has the disadvantage that its sensitivity may be somewhat inadequate, depending on household circumstances. One possible solution is to reduce the frequency of the transmitter to the region between 95 and 125 kHz. The values of C1, C2 and C4 will then have to be modified to match, so this is something for readers who like to experiment.

Do not forget that just as with the transmitter, the entire circuit (once it has been switched on, of course) is connected to the mains potential. Power for the transistor stage and the relay is taken directly from the mains voltage using a capacitive voltage divider; R5 is only necessary to limit the current through the diodes to a safe value on switch-on. Rectification is provided by diodes D4-D7 and filtering by C7. The imped-

ance of C8 is low enough to provide sufficient current. The no-load voltage (when T2 is not conducting and the relay is not activated) is limited by zener diode D3. R6 and R7 discharge C8 immediately after the circuit is disconnected from the mains, in order to prevent any dangerous voltage from remaining on the input terminals.

Connections A and B are provided for test purposes and also allow something other than the relay to be energised (but keep in mind that the circuit is electrically connected to the mains network!). The pinout of the relay is standard, so a type other than that shown in the components list can also be used, as long as you make sure that the operating voltage is 24 V and the operating current does not exceed 28 mA.

(024078-1)



COMPONENTS LIST

Resistors:

R1 = 1M Ω 25
R2 = 220k Ω
R3 = 39k Ω
R4 = 6k Ω 8
R5 = 220 Ω
R6,R7 = 470k Ω
P1 = 10M Ω preset

Capacitors:

C1 = 22nF 275VAC Class X2, lead pitch 15mm
C2 = 22nF, lead pitch 5 mm
C3 = 220pF
C4 = 2nF2, lead pitch 5mm
C5 = 680pF
C6 = 100nF, lead pitch 5 mm
C7 = 100 μ F 40V radial
C8 = 330nF 275VAC, Class X2, lead pitch 22.5mm or 27.5mm

Inductors:

L1 = 470 μ H

Semiconductors:

D1 = BAT85
D2 = 1N4148
D3 = zener diode 24V 1.3W
D4-D7 = 1N4007
T1 = BC557B
T2 = BC547B

Miscellaneous:

K1,K2 = 2-way PCB header, lead pitch 7.5 mm
Tr1 = 5:5 turns 1mm dia. isolated wire on N30 ring core 16x6.3 mm, B64290L45X830 EPCOS (Farnell # 311-0266)
Rel = PCB relay, 1 c/o contact, 8A 24V 1200 Ω , e.g., Schrack # V23057-B0006-A201